GOING WITH THE WIND: THE FUTURE OF OFFSHORE WIND

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This article explores the environmental impacts of offshore wind development under current regulations and practices, arguing the need for more robust measures to ensure environmentally responsible offshore wind development. Focusing mostly on recent offshore wind developments on the east coast of the United States, this article presents a combined scientific and legal analysis of current offshore wind regulations and practices. The article discusses current trends in the technology of offshore wind, the political influence that has been seen in the wind industry, and cases that are being brought against BOEM highlighting holes in the regulatory practices currently in place. Ultimately the article focuses on methods of responsible offshore wind development such as requiring the best available technology, increased community involvement and accountability, and ensured compliance.

I. INTRODUCTION

With the United States' population continuing to rise, commercial electricity usage increasing, and data centers becoming more common, energy demand has increased.[1] In tandem, the energy sector is affecting climate change at an astronomical rate. Fossil fuels such as coal, oil, and natural gas account for over 75 percent of greenhouse gas emissions.[2] Additionally, with the growing demand for energy, increased mining and drilling destroy land, soil, and other natural resources, furthering the effects of climate change. To combat climate

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[1] Nida Çakır Melek & Alex Gallin, *Powering Up: The Surging Demand for Electricity*, FED. RSRV. BANK OF KAN. CITY (Sept. 25, 2024).
[2] *Causes and Effects of Climate Change*, UNITED NATIONS (last visited Aug. 19, 2025).

change, the focus has shifted to finding new, more sustainable energy sources, including solar, onshore wind, offshore wind, and hydropower.

Our current energy infrastructure and production may be insufficient to meet future needs, both in terms of the environment and required electricity generation. Many states have implemented climate plans that move from carbon-intensive energy production to more renewable sources. The move to renewable energy is not a new concept. Still, it is becoming increasingly evident in its necessity due to the immense benefits to the environment and to meet the energy demand of the growing population. Deploying offshore wind is necessary to meet climate goals. By placing wind turbines in the ocean, offshore wind farms allow unobstructed access to high-velocity winds. Offshore wind has higher efficiency energy production (kWh per unit) than both onshore wind[3] and solar power.[4] Offshore wind projects have faced many challenges, such as public scrutiny and permit and funding freezes. However, this renewable energy source, if developed responsibly, could provide affordable, clean energy to coastal communities.

On the federal level, the Bureau of Ocean Energy Management (BOEM) regulates offshore wind energy. BOEM plays a significant role in almost all aspects of the offshore wind leasing and development process.[5] In addition to BOEM, offshore wind is influenced by political parties as they move in and out of the executive office. State agencies balance the influence of the federal government by setting clean energy goals and incentivizing offshore wind projects.[6] Despite the existing regulatory framework for offshore wind currently in existence, the environment is a factor not focused on enough.

This article argues that while offshore wind is promoted as a green energy solution and offers enormous benefits to reducing carbon while meeting growing

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[3] *Onshore vs Offshore Wind Energy: What's the Difference?,* NATIONALGRID (last visited Aug. 20, 2025).
[4] *Solar Energy Vs Wind Energy: Cost, Efficiency, Applicability, And Environmental Impact*, NRG CLEAN POWER (Jan. 2, 2025).
[5] *See* ADAM VANN, CONG. RSCH. SERV., R40175, WIND ENERGY DEVELOPMENT: LEGAL FRAMEWORK SUMMARY (2023).
[6] *See States Power Offshore Wind Forward Amid Federal Retreat,* NAT'L CAUCUS OF ENV'T LEGISLATORS (Apr. 15, 2025).

energy needs, the current regulatory approach does not sufficiently ensure that the development of offshore wind considers both short-term and long-term impacts to the environment, and additional regulations are necessary. This article will analyze offshore wind scientifically and legally, focusing mostly on development along the Atlantic Coast of the United States. Part II will describe the scientific and technical background of offshore wind and the growing energy productivity of these turbines. Part III will show the relationship between federal agencies, the executive branch, and state actors responsible for offshore wind projects. Part IV addresses misconceptions of offshore wind, exemplifying the benefits and why offshore wind is necessary to meet policy goals. Part V focuses on the laws that play a role in offshore wind and recent offshore wind cases challenging those laws. Part VI will address the methods for responsible offshore wind development and implementation measures to ensure legal and environmental compliance. Ultimately, further environmental regulation and considerations are necessary to address current regulatory flaws, ensuring that the energy market can become greener in an environmentally responsible manner.

II. WHAT IS OFFSHORE WIND?

A. The History of Offshore Wind

Throughout the 1980s, onshore wind power grew rapidly across Europe and the United States. Due to its technological complexity and prohibitive costs at the time, offshore wind remained largely experimental. It was not until 1990, when the world's first offshore wind turbine was successfully commissioned in Sweden, that offshore wind became a viable option as a renewable energy source. That Swedish offshore wind turbine "was built as a test plant 'in order to examine the influence of birds, fish and fishing, shipping, public opinion, maintenance and the effects on foundations from wind and ice.'"[7] Shortly after, in 1991, the Vindeby Offshore Wind Farm, the world's first commercial wind farm, was commissioned off the coast of Lolland, Denmark.[8] The early 2000s saw advancement in wind turbine technology, leading to the world's largest offshore

[7] *Offshore Wind Turbines*, UNIV. OF STRATHCLYDE (last visited Aug. 20, 2025).
[8] *Vindeby Offshore Wind Farm*, TETHYS (last visited May 21, 2025).

wind farm in 2013, located in the UK.[9] The Block Island Wind Farm was the first commercial offshore wind farm in the United States, commissioned in 2016 off the coast of Rhode Island.[10] Since 2016, several other projects have been proposed and completed along the U.S. East Coast, aiming to contribute to the nation's renewable energy goals.[11]

B. The Science Behind Offshore Wind

Offshore wind energy is a renewable energy that has gained attention in recent years. Like onshore wind energy, offshore wind energy is produced when wind blows and turns the turbine blades, which connect to a rotor that then rotates to generate electricity.[12] Many of these turbines are located on the U.S. Outer Continental Shelf (OCS)[13], submerged lands under federal jurisdiction that begin three nautical miles (nm) from the U.S. coastline, extending seaward to 200nm.[14] Typically, these projects are located around 25 nm to 37 nm,[15] giving the wind farms an unobstructed wind path and greater wind strength. Projects are limited by ocean depth; offshore wind projects with fixed foundations are not often located in waters exceeding 196 feet in depth.[16] This is due to ocean topography and financial limitations. As you move further out to the deep sea, the ground's topography becomes less flat, with ridges making it harder to secure the fixed turbine to the seabed.[17] Likewise, the greater the ocean depth, the more complex and thus costly it is to erect a wind turbine.[18] A solution that has previously been

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[9] *About the London Array,* LONDON ARRAY (last visited Aug. 20, 2025).
[10] Aidan Ackerman et al., *Block Island Wind Farm,* LANDSCAPE PERFORMANCE SERIES (2019).
[11] *Lease and Grant Information,* BUREAU OF OCEAN ENERGY MGMT. (last visited Aug. 20, 2025); *Offshore Renewable Activities – Activities by Name,* BUREAU OF OCEAN ENERGY MGMT., (last visited Aug. 20, 2025).
[12] *How Electricity Is Generated*, OFFSHORE WIND MD. (last visited Aug. 20, 2025).
[13] *Lease and Grant Information, supra* note 11; *Offshore Renewable Activities – Activities by Name*, *supra* note 11.
[14] *Outer Continental Shelf*, BUREAU OF OCEAN ENERGY MGMT. (last visited Aug. 20, 2025).
[15] *Data Show Big Gains for Offshore Wind*, NAT'L RENEWABLE ENERGY LAB'Y (Oct. 8, 2020) (calculations adjusted).
[16] *Everything You'd Like to Know About Offshore Wind Farm Construction*, IBERDROLA (last visited Aug. 20, 2025).
[17] *Ocean Floor Features,* NOAA (last visited Aug. 20, 2025); Frank Smith, *Why Wind Turbines Can't Go Further Out*, THE SANDPAPER (Aug. 17, 2022).
[18] *Id.*

discussed is the development of floating turbines. Unlike traditional offshore wind turbines, floating turbines are mounted to a buoy-like system with cables anchoring it to the sea floor; however, these turbines maintain a similar windmill-like appearance as traditional turbines above the surface.[19] This allows for the turbines to be placed in deeper waters, as deep as 1,000 meters, creating more acreage for offshore wind farms to be placed.[20] Additionally, geological challenges are less of an issue because the turbine does not need to be anchored to the sea floor in the same manner.[21]

Because offshore wind turbines are in the ocean, they need to be built sturdier and larger than traditional onshore wind turbines. Offshore wind turbines can range from about 550 feet tall to upwards of about 850 feet—compared to the Statue of Liberty at 305 feet tall.[22] These large turbines are not the only structures required for offshore wind energy generation; substations and cables are needed to get the energy from the turbines to the shore for consumers to utilize. Substations are often found in the leased area of the wind farms in the ocean, but they can also be located onshore.[23] These substations then "receive power from wind turbine facilities via electric cables and act as a collector to transport the electricity to the export cable and to onshore substations."[24] Offshore wind is more efficient than onshore wind because the turbines run at 35 to 50 percent capacity, compared to the onshore capacity of 25 to 35 percent.[25] With current technology, just one spin of an offshore wind turbine blade can provide power to an average household for over two days.[26] Current wind farms have an expected life cycle of 20 to 30

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[19] *Top 10 Things You Didn't Know About Offshore Wind Energy*, U.S. DEP'T OF ENERGY (Aug. 21, 2024).
[20] Rebecca Loomis & Dr. Francine Kershaw, *Floating Offshore Wind Brings Challenges and Opportunities*, NRDC (May 19, 2021).
[21] Nathan Rebuck et.al., *Floating Offshore Wind: Overcoming Seafloor Challenges*, INTEGRAL (Jan. 6, 2024).
[22] *Offshore Wind 101*, N.Y. STATE ENERGY RSCH. AND DEV. AUTH. (last visited Aug. 20, 2025).
[23] *See Offshore Wind - Substations (Proposed or Installed)*, ARCGIS HUB (last updated Aug. 5, 2025).
[24] *Id.*
[25] *Wind Turbines and Energy Production*, BUS. NOR. (last updated Nov. 13, 2024).
[26] Alina Gonzalez, *Wind on the Water: Five Benefits of Offshore Wind Energy*, CTR. PROGRESSIVE REFORM (June 15, 2021).

years;[27] however blades, gearboxes, and other smaller hardware may need to be replaced or repaired earlier. At the end of a wind turbine's life, the structure typically is removed, but occasionally offshore wind turbines can be refurbished, with parts getting replaced but the original structure remaining.[28]

III. WHY IS OFFSHORE WIND ENERGY IMPORTANT?

A. Common Misconceptions

Science counters the widespread myths regarding the devastating effects of offshore wind.[29] One of the most common fears in public perceptions of offshore wind projects is that the wind turbines will disrupt the pristine view for beachgoers and homeowners. This common issue referred to as the Not in My Back Yard (NIMBY) mentality has led to local opposition to offshore wind projects. While offshore wind turbines are large, due to their placement being far out, the turbines are often barely visible due to the curvature of the Earth's horizon line.[30] For example, the Coastal Virginia Offshore Wind Project has turbines 27 to 42 miles off the coast that are often not visible.[31] There are exceptions—if a wind project is closer to shore or if the day is clear and cloud-free, but on average, people can only see about 3 miles out when standing on the beach.[32]

A similar concern is that wind farms could impact tourism and property values, especially if the farm is located close enough to shore so that turbines are

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[27] Simon Warder & Matthew Piggott, *The Future of offshore wind power production: Wake and climate impacts,* 380 APPLIED ENERGY 124956 (2015); *see also* Eva Topham & David McMillan, *Sustainable Decommissioning of an Offshore Wind Farm,* 102 RENEWABLE ENERGY 470, 471, 479 (2017).
[28] Topham & McMillan, *supra* note 27, at 471.
[29] Sam Wojcicki, *Responsible Offshore Wind Development is a Clear Win for Birds, the U.S. Economy, and Our Climate*, NAT'L AUDUBON SOC'Y (Jan. 17, 2025).
[30] *See Project 1*, ATLANTIC SHORES OFFSHORE WIND (last visited Aug. 20, 2025) (exemplifying how the curvature of the earth reduces visibility of wind turbines from the shoreline).
[31] Margaret Berei, *What Can North Carolina Learn from Virginia's Investments in Offshore Wind?*, NC SUSTAINABLE ENERGY ASS'N (July 22, 2024).
[32] *See* Nikki Withers, *How Far Away is the Horizon?*, BBC SCI. FOCUS (last visited Aug. 20, 2025).

visible. The concern is valid; however, evidence suggests that the impact is minimal to none. In fact, studies suggest offshore wind may benefit tourism and the housing market. Offshore wind farms have seen an increase in tourism, with a market opening up for offshore wind boat tours, viewing platforms, or even virtual tours online.[33] A study of rentals on Block Island indicated that during each peak-tourism month of July and August following the construction of the Block Island Wind farm. "The BIWF caused a seven-night increase in the number of nights reserved, a nineteen percentage point increase in occupancy rates, and a $3,490 increase in revenue for AirBnb properties in Block Island relative to properties in control group cities."[34]

Likewise, a study by the Lawerence Berkeley National Laboratory and the University of Connecticut found no evidence that proximity to offshore wind projects impacted led to decline of home property values.[35]

Another concern that has raised attention is that offshore wind projects kill whales. However, reports and studies by the Marine Mammal Commission[36] and the National Oceanic and Atmospheric Administration (NOAA)[37] indicate no correlation between the number of deaths among whales and offshore wind projects. Similarly, many people believe that offshore wind projects will cause more fatalities for bird species. While there are deaths related to bird collisions with turbines, the estimated deaths are small, especially compared to other sources of human-caused bird mortalities.[38] A report by the Audubon Society, a nonprofit that seeks to protect birds, found that rather than harming birds, if done

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[33] PANKAJ LAL ET AL., THE POTENTIAL OF OFFSHORE WIND ENERGY TOURISM IN OCEAN CITY, NEW JERSEY 1–2 (2021).
[34] Andrew Carr-Harris & Corey Lang, *Sustainability and Tourism: The Effect of the United States' First Offshore Wind Farm on the Vacation Rental Market,* RES. AND ENERGY ECON. 51, 64 (2019).
[35] CAROL ATKINSON-PALOMBO & BEN HOEN, LAWRENCE BERKELEY NAT'L LAB'Y, RELATIONSHIP BETWEEN WIND TURBINES AND RESIDENTIAL PROPERTY VALUES IN MASSACHUSETTS 14 (2014).
[36] *See* *Update on Strandings of Large Whales Along the East Coast*, MARINE MAMMAL COMM'N (Feb. 21, 2023).
[37] *Frequent Questions – Offshore Wind and Whales*, NOAA FISHERIES (last updated Mar. 14, 2024).
[38] *See* Jack Clarke, *Concern About Killer Offshore Wind Turbines is for the Birds*, ECORI NEWS (Nov. 14, 2018).

responsibly, offshore wind has immense benefits for birds.[39] For example, the report found that replacing the use of fossil fuels with offshore wind will help protect the deteriorating habitats for birds due to climate change.[40]

B. Benefits of Offshore Wind

Despite the spread of misinformation, the benefits of offshore wind are significant and promising. The U.S. Department of Energy has suggested that the total potential power from offshore wind in U.S. federal waters can produce over three times the annual electricity consumption in the U.S.[41] This is important because as land becomes developed and space for additional infrastructure shrinks, offshore wind offers vast potential to meet the energy demands without the constriction of land. The large size of offshore wind turbines and the stronger ocean winds allow for more consistent and abundant production compared to onshore wind farms.[42] "[A] turbine in a 15-mph wind can generate twice as much energy as a turbine in a 12-mph wind."[43] In addition to the abundant production, the consistent ocean wind allows for higher reliability in power generation, which is not a guarantee with other methods of renewable sources.[44]

The most crucial benefit of offshore wind, and why it is vital to our growing energy demand, is that it reduces carbon dioxide emissions. "According to the International Energy Agency (IEA), each gigawatt-hour (GWh) of energy produced by offshore wind power can avoid the emission of around 500 tonnes of CO_2, depending on the fossil source

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[39] *See* Wojcicki, *supra* note 29.
[40] NATHANIEL SEAVY ET AL., NAT'L AUDUBON SOC'Y, DEVELOPING THE OFFSHORE WIND THAT BIRDS NEED 5 (2025).
[41] *See Offshore Wind Research and Development*, U.S. DEP'T OF ENERGY, ?t (last visited Mar. 3, 2025); OCEAN CONSERVANCY, PROTECTING THE OCEAN AND SUPPORTING COMMUNITIES THROUGH RESPONSIBLE OFFSHORE WIND 4 (2024).
[42] *See What are the advantages and disadvantages of offshore wind farms?*, AM. GEOSCIENCES INST. (last visited Sep. 2, 2025).
[43] *What are the Advantages and Disadvantages of Offshore Wind Farms?*, AM. GEOSCIENCES INST. (last visited Aug. 20, 2025).
[44] *Advantages of Offshore Wind*, ØRSTED (last visited Aug. 20, 2025).

replaced."[45] 32 states have released climate action plans, with 24 states and the District of Columbia including specific targets for greenhouse gas emissions reduction.[46] For example, North Carolina's Clean Energy Plan calls for reducing greenhouse gas emissions in the electric power sector by "70% below 2005 levels by 2030 and attain[ing] carbon neutrality by 2050."[47] Duke Energy, the primary electric power company in North Carolina, has adopted a plan that includes offshore wind development to help them attain this goal.[48] Similarly, Maine has set the goal of carbon neutrality by 2045 and "reduce gross [… greenhouse gas] emissions by 45 percent from 1990 levels by 2030 and 80 percent by 2050."[49] A 2024 report by the Maine Department of Environmental Protection found that the state is on track to reach this goal and has an offshore wind initiative to encourage the development of projects to help meet the target.[50] With the influence of states aiming to reduce greenhouse gas emissions, the need for renewables, such as offshore wind energy, is inevitable.

C. Economic Impact

The process of offshore wind development is often criticized as being costly and not worth the investment, especially because companies are starting from scratch with the green infrastructure.[51] The unsubsidized cost of offshore wind is estimated to be over $120/MWh, making it one of the highest-cost energy resources.[52] However, because of regulation, there are subsidies and tax incentives that drastically reduce the cost of offshore wind,[53] over 20 companies have

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[45] Davide Ciravolo, *Environmental Benefits of Offshore Wind Energy*, BLUE LIFE HUB (Nov. 9, 2024).
[46] *State Climate Policy Maps*, CTR. FOR CLIMATE AND ENERGY SOLS. (last visited Aug. 22, 2025).
[47] *Clean Energy Plan*, N.C. DEP'T OF ENV'T QUALITY (last visited Aug. 22, 2025).
[48] *See* Cassie Gavin, *NCSEA Statement on Duke Energy's Carbon Plan Supplemental Planning Analysis*, NC SUSTAINABLE ENERGY ASS'N (Feb. 5, 2024).
[49] *Maine Remains on Track to Fulfill Goals According to the Greenhouse Gas Emissions Report*, ME. DEP'T OF ENV'T PROT. (June 10, 2024).
[50] *Id.*; *See Offshore Wind*, GOVERNOR'S ENERGY OFF. (last visited Aug. 25, 2025).
[51] Travis Fisher, *Unpacking the High Cost of Offshore Wind Policy*, CATO INST. (Jan. 10, 2024); *Economics and Incentives for Wind*, WINDEXCHANGE (last visited Aug. 25, 2025).
[52] Fisher, *supra* note 51.
[53] U.S. DEP'T OF ENERGY, ADVANCING THE GROWTH OF THE U.S. WIND INDUSTRY: FEDERAL INCENTIVES, FUNDING, AND PARTNERSHIP OPPORTUNITIES (Apr. 2023).

obtained leases to develop wind farms.[54] Additionally, as time goes on, the U.S. Energy Information Administration "estimates that the costs for offshore wind installed in 2040 will be about one-third less, with levelized costs between $74.47/MWh and $105.39/MWh, with an average price of $85.53/MWh."[55]

Offshore wind also offers economic benefits. The highest energy demand is found in coastal communities, resulting in some of the highest wholesale electricity prices.[56] Unlike many solar projects located in the arid west, away from population centers, in rural areas, offshore wind will allow energy generation to be close to consumers.[57] The long-term financial benefits of offshore wind are high: "[t]he average acre from an offshore wind lease sale brings in nearly 12,500 percent more revenue for taxpayers than 1 acre of oil."[58] In some cases, offshore wind energy could lower consumers' electricity costs, making it 28% cheaper than gas.[59] In addition to consumer benefits, energy companies could be saving money. "Developing 127 gigawatts offshore wind energy capacity over 20 years would provide energy at a cost of about $36 billion less than the production of economically recoverable new offshore oil and natural gas on the Atlantic coast."[60] Opportunity for offshore wind jobs is also immense. A fully operating domestic offshore wind farm can create up to 49,000 manufacturing and supply chain jobs.[61]

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[54] *Leasing and Grant Information,* BUREAU OF OCEAN ENERGY MGMT. (last visited Aug. 25, 2025).
[55] Jonathan A. Lesser, *Out to Sea: The Dismal Economics of Offshore Wind,* MANHATTAN INST. (Aug, 25, 2020).
[56] *See Offshore Wind Power Facts,* AM. CLEAN POWER (last visited Aug. 25, 2025).
[57] *See* Betty Resnick & Arica Hamilton, *Solar Energy Expansion and its Impacts on Rural Communities,* MARKET INTEL (Aug 8, 2024); *see also Solar Explained*, U.S. ENERGY INFO. ADMIN. (last updated July 12, 2024).
[58] Michael Freeman, *Offshore Wind Can Lower Energy Prices and Beat Out Oil and Gas,* CTR. AM. PROGRESS (Sep. 23, 2022).
[59] *Id.*
[60] *Offshore Wind Report: Key Findings*, OCEANA (last visited Aug. 25, 2025).
[61] *See* JEREMY STEFEK ET AL., NAT'L RENEWABLE ENERGY LAB'Y, U.S. OFFSHORE WIND WORKFORCE ASSESSMENT 8 (2022).

IV. WHAT IS THE INFLUENCE OF FEDERAL AND STATE GOVERNMENTS ON OFFSHORE WIND?

A. The Bureau of Ocean Energy Management

BOEM was established in 2010 under the Department of the Interior Secretarial Order 3299.[62] This order created three new agencies from the former Mineral Management Service, which was responsible for managing oil, gas, and mineral resources.[63] The split occurred after the Deepwater Horizon oil spill, which suggested potential conflict of interest between regulatory missions of the umbrella agency.[64] After splitting, BOEM became responsible for managing "development of U.S. Outer Continental Shelf (OCS) energy, mineral, and geological resources in an environmentally and economically responsible way."[65] The agency acquired its regulatory authority under the Energy Policy Act of 2005, which is "an amendment to OCS Lands Act, grants BOEM lead management authority for marine renewable energy projects on Federal offshore lands, and other projects that make alternative use of existing oil and natural gas platforms."[66] With this Congressional delegation of power, BOEM regulates almost every aspect of offshore wind energy: planning, leasing of areas, site assessments by lessee, and construction and operations.[67] In 2024, BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) finalized the Renewable Energy Modernization Proposed Rule: "The final rule increases certainty and reduces the costs associated with the deployment of offshore wind projects by modernizing regulations, streamlining overly complex processes and removing unnecessary ones, clarifying ambiguous regulatory provisions, and enhancing compliance requirements."[68] Additionally, specifically for renewable energy programs like offshore wind, BOEM must comply with 30 CFR 585,

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[62] *Ocean Energy Management Bureau*, FED. REG. (last visited Aug. 25, 2025).
[63] *Id.*
[64] *See Salazar Divides MMS's Three Conflicting Missions,* U.S. DEP'T OF INTERIOR (May 19, 2010).
[65] *About BOEM*, BUREAU OF OCEAN ENERGY MGMT.,(last visited Aug. 25, 2025).
[66] *BOEM Governing Statutes*, BUREAU OF OCEAN ENERGY MGMT. (last visited Aug. 25, 2025).
[67] *Regulatory Framework and Guidelines*, BUREAU OF OCEAN ENERGY MGMT. (last visited Aug. 25, 2025).
[68] *Id.*

which outlines procedures and responsibilities to follow in developing energy on the OCS.[69]

Offshore wind projects are not completed overnight, as it can take up to 11 years for project completion.[70] The first step is the planning and analysis stage, which lasts about two years and identifies potential sites and environmental reviews by federal, state, tribes, and other agencies.[71] Next, BOEM leases the site. Leases can be issued for submerged land through a competitive process, such as an auction, or a non-competitive process, such as an applicant requesting a non-competitive lease.[72] The leasing stage can take one to two years.[73] However, it is essential to note that obtaining a lease does not give developers permission to build or construct anything—BOEM must first approve proposals and plans before any construction can begin.[74]

Once the lease is granted, the lessee conducts a site assessment plan, which details the lessee's proposal for the construction.[75] At the site assessment phase, the lessee conducts surveys and studies to determine the site characterization, including plans and environmental impacts.[76] This is the longest part of the developmental process, taking up to five years to complete.[77] Finally, the construction and operation of the project occur within about two years.[78] During this phase, "BOEM conducts environmental and technical reviews of the [… Construction and Operations Plan] and decides whether to approve, approve

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[69] 30 C.F.R. § 585 (2025).
[70] *Regulatory Framework and Guidelines*, *supra* note 67 (About 2 years is estimated for planning and analysis, 1 to 2 years for leasing process, up to 5 years for the site assessment, and about 2 years for constriction which totals to approximately 11 years).
[71] *Id.*; BUREAU OCEAN ENERGY MGMT., FACT SHEET: WIND ENERGY COMMERCIAL LEASING PROCESS (May 2021).
[72] FACT SHEET: WIND ENERGY COMMERCIAL LEASING PROCESS, *supra* note 71.
[73] *Id.*
[74] *Id.*
[75] *Id.*
[76] *Id.*
[77] *Id.; Regulatory Framework and Guidelines*, *supra* note 67.
[78] FACT SHEET: WIND ENERGY COMMERCIAL LEASING PROCESS, *supra* note 71; *Regulatory Framework and Guidelines*, *supra* note 67.

with modification, or disapprove the COP."[79] The process seems long, but these steps and requirements are implemented to ensure development is completed in a "safe and environmentally sound manner."[80]

B. State Agencies

States are also key stakeholders and partners in developing offshore wind projects. State governments sometimes act as motivator for offshore wind projects—they pass laws requiring greenhouse gas emissions reductions and policies requiring offshore wind to be an energy source.[81] For example, ten states currently have laws requiring offshore wind development.[82] North Carolina recently had their "carbon plan" approved by its Utilities Commission, which required the state to reduce carbon levels, and the plan included offshore wind development to help them meet that goal.[83] In addition to developing offshore wind, states have jurisdiction over the area from the coastline up to three nautical miles out.[84] Transportation boats, cables, and substations will likely have to cross this zone and abide by state laws and permits.[85] Furthermore, states have the option to sign contracts with wind developers to directly purchase power or mandate that state utilities obtain a certain percentage of their energy from offshore wind projects.[86] With this, states set standards to ensure the projects are cost-effective, offer the best value to ratepayers, support local economic development, use local ports, and hire local workers.[87] States can also invest in infrastructure to encourage offshore wind development. For example, proposed legislation in California (A.B.472) "would require the state to assess funding needs and opportunities for developing port infrastructure that can aid offshore

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[79] FACT SHEET: WIND ENERGY COMMERCIAL LEASING PROCESS, *supra* note 71; *Regulatory Framework and Guidelines*, *supra* note 67.
[80] 30 C.F.R. § 585.101 (2025).
[81] *The Federal Government's Role Ensuring Responsible Development*, OFFSHORE WIND MD. (last visited Aug. 25, 2025).
[82] *Id.*
[83] *North Carolina's Carbon Plan*, NC SUSTAINABLE ENERGY ASS'N (last visited Aug. 25, 2025).
[84] 43 U.S.C. § 1301 (1953).
[85] *See i.e.*, *Offshore Wind Development – Jurisdiction*, NC DEP'T OF ENV'T QUALITY (last visited Aug. 25, 2025).
[86] *The Federal Government's Role Ensuring Responsible Development*, *supra* note 81.
[87] *Id.*

wind energy development in the coming years."[88] Even amongst federal turmoil in offshore wind energy development, states remain a proponent of cheaper and greener energy to meet their states' needs.

C. Impact of The Executive Branch and Political Parties

Offshore wind also involves other aspects of the executive branch, as it must balance the competing demands between the environment, the military, and economics. For example, NOAA works with BOEM to share research on proposed sites and environmental aspects of project development.[89] Similarly, the Department of Defense (DOD), through its Clearinghouse—a program that looks at potential impacts of energy projects and other developments on the military—works with BOEM as well. "The Clearinghouse leads DOD interactions with BOEM for offshore energy compatibility and coordinates at every stage of planning, permitting, and development throughout the Atlantic... The efforts of the Clearinghouse, BOEM, and states create plans that support offshore energy development while safeguarding military missions."[90] BOEM also works closely with the National Aeronautics and Space Administration (NASA) to map the best potential locations for future wind projects and to ensure that activities could co-exist with wind energy development.[91]

Recently, the offshore wind community has seen the force and impact that the presidential administrations can have on the longevity and success of offshore wind regulation, as BOEM is an executive agency. The difference between the Biden administration and the 2025 Trump administration is a perfect example of this influence. Under the Biden administration, a push for renewables, including offshore wind, was seen in the 2022 Inflation Reduction Act.[92] The 2022 Inflation Reduction Act provided a 30% tax credit for developers who start constructing

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[88] *States Power Offshore Wind Forward Amid Federal Retreat, supra* note 6.
[89] *Offshore Wind Energy,* NOAA Fisheries (last visited Aug. 25, 2025).
[90] *Offshore Energy,* DEP'T OF DEF. (last visited Aug. 25, 2025).
[91] *See BOEM Finalizes Wind Energy Areas in the Central Atlantic,* BUREAU OF OCEAN ENERGY MGMT. (July 31, 2023).
[92] CORRIE E. CLARK ET AL., CONG. RSCH. SERV., IN11980, OFFSHORE WIND PROVISIONS IN THE INFLATION REDUCTION ACT 2 (2024).

offshore wind projects before 2026.[93] The Biden administration also set "goals to deploy 30 gigawatts (GW) of offshore wind energy capacity by 2030 and 15 GW of floating offshore wind energy capacity by 2035."[94] Likewise, the administration had approved over 15 gigawatts of offshore wind by September of 2024, showing great strides in reaching the offshore wind energy goal set.[95] Of the executive administrations, the Biden administration was perhaps the most progressive in terms of promoting offshore wind and renewable energy.

There has been a complete change in how the Biden administration approached offshore wind compared to the current Trump administration. In his first month back in office, President Trump called for a temporary pause on leasing, approvals, permits, or loans for offshore wind projects by BOEM.[96] Likewise, President Trump ordered a pause on Inflation Reduction Act funding, which was providing funding to offshore and other renewable energy initiatives.[97] In response, 18 attorney generals filed a lawsuit to block the President's actions.[98] The recent tax breaks, subsidies, and other regulatory tools has caused even anti-wind proponents to become concerned. The Thomas Jefferson Institute for Public Policy, a think tank that has previously opposed offshore wind, has acknowledged offshore wind's potential compared to other renewables and the need for the completion of the Virginia Wind Farm.[99]

> The wind project will not have a great capacity factor and may often be idle, but when running, it will produce substantial

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[93] *Id.*
[94] *Biden-Harris Administration Advances Offshore Wind Energy Leasing in Guam*, BUREAU OF OCEAN ENERGY MGMT. (Jan. 3, 2025).
[95] *Biden-Harris Administration Marks Major Milestones for Offshore Wind, Approves Tenth Project*, U.S. DEP'T OF THE INTERIOR (Sept. 05, 2024).
[96] LAURA COMAY, CONG. RSCH. SERV., IN12509, STATUS OF U.S. OFFSHORE WIND LEASING AND PERMITTING: PRESIDENT TRUMP'S JANUARY 2025 WIND LEASING MEMORANDUM (2025); Kristina Zagame, *Trump Initially Ordered a Pause on IRA Funding – What Does it Mean for Solar?*, ENERGYSAGE (Feb. 7, 2025).
[97] *Id.*
[98] Nate Raymond, *Democratic-led States Sue to Block Trump's Halting of Wind Projects*, REUTERS (May 5, 2025, 2:26 PM).
[99] Stephen D. Haner, *Trump Official Asked to Stop Dominion Wind Construction: Why the Thomas Jefferson Institute Didn't Join the Request*, THOMAS JEFFERSON INST. FOR PUB. POL'Y (Feb. 12, 2025).

> electricity. It will be far superior to solar panels. Kill it, and Virginia needs that much more power from some other new or leased generation, again at a major cost to ratepayers.[100]

In April 2025, President Trump ordered construction to halt for the Empire Wind 1 project off the coast of Long Island.[101] This was due to alleged concerns over the Biden Administration rushing through approvals of offshore wind without sufficient consideration of the project's impacts.[102] The Trump administration finally lifted this stop-work order almost a month later.[103] However, the green light to continue with the project, which was 30% complete, came at the price of negotiating the revival of a potential natural gas pipeline.[104] While this is not ideal, it echoes the idea that the immense cost of stopping of offshore wind projects in the development phase could help save them from being cancelled.

Additionally, under the Trump administration, essential environmental laws, such as the National Environmental Protection Act (NEPA), and their power to hold energy companies and developers accountable for their environmental impacts may decline. The Trump Administration put forth an interim final rule that would rescind all the Council on Environmental Quality's (CEQ) NEPA regulations.[105] While this may not immediately affect offshore wind, as BOEM is currently prohibited from leasing sites, making NEPA unnecessary, this rule would have impacts once offshore wind sites can be leased. For one, it would limit NEPA considerations to those "reasonably foreseeable impacts." [106] The problem with this is that the ocean is still a mystery, so limiting the scope of impacts would potentially allow environmental problems to be ignored. The

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[100] *Id.*
[101] Lauren Dalban, *Trump Halts Construction of Big Wind Farm Off New York Coast,* THE GUARDIAN (Apr. 18, 2025).
[102] *Id.*
[103] Nichola Groom & Nora Buli, *US Lifts Ban on New York Offshore Wind Project After Natgas Pipe Compromise,* REUTERS (May 20, 2025, 12:17 PM).
[104] *Id.*
[105] Rafe Petersen et al., *Seismic Changes in Federal Environmental Reviews: CEQ to Rescind NEPA Regulations,* HOLLAND & KNIGHT (Feb. 25, 2025).
[106] *Id.*

Trump administration has also altered the government's position on the Migratory Bird Treaty Act (MBTA), repealing the opinion by the Biden administration, which stated the MBTA prohibited incidental and intentional takings; now limiting the prohibition to intentional takings only.[107] This would drastically limit the consideration given to bird species when developing offshore wind facilities, putting birds at greater risk of harm. The proposed changes and effects would reduce environmental oversight and introduce uncertainties that could cause major environmental harm. Based on recent lawsuits, the proposed changes are likely to be challenged by those who seek to increase environmental protections.[108]

These recent actions show how influential the administration can be on the progress of the green energy transition. Trump's pause on new or renewed approvals for offshore wind development may impact multiple active offshore wind projects being executed.[109] Current projections suggest that in the long run these actions will not affect the overall trajectory of renewable energy development.[110] It is clear that offshore wind energy is essential to many states and projects in development will not go down without a fight, hopefully deterring the Trump administration from further destabilizing the offshore wind industry.

V. LAWSUITS INVOLVING OFFSHORE WIND PROJECTS

As offshore wind development has increased, lawsuits opposing the projects have followed. Many lawsuits challenging offshore wind projects focus on the environmental integrity of the projects. Plaintiffs often consist of fishing groups, environmental organizations, and local communities arguing for further protection of marine ecosystems and animals.[111] Likewise, critics point to

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[107] E. Carter Clements & Eric J. Murdock, *The Pendulum Swings Back (Again) on Prohibition of Incidental Take Under the Migratory Bird Treaty Act*, HUNTON (Apr. 16, 2025).
[108] *See supra* note 98.
[109] *See Lease and Grant Information*, *supra* note 11.
[110] Kira Taylor, *What Trump's Return Means for America's Energy Transition*, FORESIGHT (Mar. 28, 2025); Benjamin Storrow et al., *Shift to Clean Energy Will Persist Under Trump, New Analyses Say*, SCI. AM. (Apr. 16, 2025).
[111] *See infra* notes 113 to 120.

shortcomings by BOEM and developers in complying with environmental laws, including NEPA and ESA.[112]

For example, in *Nantucket Residents Against Turbines v. United States Bureau of Ocean Energy Management*, plaintiffs challenged the adequacy of the 2021 Biological Opinion and the Final Environmental Impact Statement for the Vineyard Wind Project located off the coast of Massachusetts.[113] Here, a nonprofit corporation challenged the permits and approval for the Vineyard Wind Project in Massachusetts.[114] The plaintiffs sued BOEM, alleging that the agency had violated the ESA and NEPA.[115] However, the Vineyard Wind Project case has moved through courts, finding that BOEM did not violate NEPA nor ESA.[116]

Similarly, cases in New Jersey and Maryland were filed in opposition to the environmental impacts that are perceived by the specified offshore wind projects. In *Mayor & City Council of Ocean City v. U.S. Dep't of the Interior*, plaintiffs, including the Mayor, six fishers, and local businesses, challenge agency approval of the COP for an offshore wind project in Maryland, claiming that the government failed to adequately analyze the environmental impacts, especially regarding endangered species in the area, and the potential effects on local businesses.[117] A second lawsuit against the Maryland Offshore Wind Project was also brought but for different reasons. A historically conservative think tank claims that the electric cables being built under Delaware-controlled waters and wetlands pose a harm to Delaware's natural resources, and there was insufficient public input and compliance with the state's Coastal Zoning Act, ultimately posing a greater harm to Delaware than benefit.[118]

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[112] *Id.*
[113] Nantucket Residents Against Turbines v. United States Bureau of Ocean Energy Mgmt., 675 F. Supp. 3d 28 (D. Mass. 2023), *aff'd*, *sub nom.* Oliver v. U.S. Bureau of Ocean and Energy Mgmt. (In re Nantucket Residents), 100 F.4th 1 (1st Cir. 2024).
[114] *Id.* at 43–44.
[115] *Id.* at 35.
[116] *Id.* at 64; Oliver v. U.S. Bureau of Ocean and Energy Mgmt. (In re Nantucket Residents), 100 F.4th 1 (1st Cir. 2024).
[117] Mayor and City Council of Ocean City, MD v. U.S. Dep't of Interior, SAG-24-3111, 1 (D. Ct. MD July 2, 2025) (mem opinion).
[118] *See* Charles Miller, *Delaware Think Tank Challenges Offshore Wind Project*, NAT'L SEA GRANT L. CTR. (Feb. 26, 2025).

The New Jersey case, *County of Cape May v. United States*, was dismissed without prejudice as the county and other plaintiffs argued that BOEM had failed to analyze the emissions and climate change in their Final Environmental Impact Statement, required under NEPA, only focusing on "partial, project-specific climate impacts in the nearby geographic area but attempts to quantify only emissions offsets from the Project, with limited qualitative descriptions of emissions generated from construction."[119] Even if the courts find that there has been no violation of these laws, as seen in a handful of cases that have been decided upon,[120] to ensure compliance with the law and to reduce the likelihood of being taken to court, BOEM and the energy corporations should work to implement methods in their research and development process that go above the base level requirements of law. Lawsuits continue to be brought, focusing on the shortcomings of current environmental practices by BOEM and developers. To combat the onslaught of cases, there need to be additional and/or stricter methods to address these concerns.

VI. METHODS TO ADDRESS ENVIRONMENTAL AND LEGAL COMPLIANCE CONCERNS

Concerns over the environmental impact of wind development are understandable given the importance of the ocean. The ocean is essential to maintaining life on Earth, and disruption to the marine ecosystem could result in long-term damage and unforeseen impacts. Fossil fuels are a significant cause of harm to the marine ecosystem, and moving towards renewable energy can mitigate these negative impacts. Burning fossil fuels releases carbon dioxide that is absorbed by the ocean, increasing its average acidity.[121] For this and many other reasons, BOEM and states need to ensure responsible offshore wind development, and to do this, they need to go beyond the law's bare minimum requirements.

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[119] Complaint at 40, Cnty. of Cape May v. United States, No. 1:23-cv-21201 (D.N.J. 2023).
[120] *See* Benjamin Storrow, *4 Lawsuits Threaten Vineyard Wind*, E&E NEWS (Mar. 29, 2023, 6:54 AM); *see* Mayor & City Council of Ocean City v. U.S. Dep't of the Interior, No. 1:24-cv-03111 (D. Md. 2024); *see* Cnty. of Cape May v. United States, No. 1:23-cv-21201 (D.N.J. 2023).
[121] *See* NAT. RES. DEF. COUNCIL, OCEAN ACIDIFICATION: THE OTHER CO_2 PROBLEM (2009).

This is not to suggest that current practices are ineffective, but rather there are additional steps that could strengthen existing safeguards and practices to further protect the environment. BOEM already requires several baseline environmental practices, including consideration of the biodiversity of a leased area and Marine Protected Areas, environmental assessments and impact statements required under NEPA, and consultation with NOAA Fisheries, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service (NMFS) under the ESA and the Magnuson-Stevens Fishery Conservation and Management Act..[122] Additionally, BOEM has requirements that look at archaeological resources and other historic properties, water quality, and endangered species and their habitats.[123] While BOEM and NOAA, along with state agencies, are taking preventive actions as required by law, some mitigation practices are not required; rather they are encouraged or recommended, and applied on a project-by-project basis.[124] Additionally, procedural requirements, such as NEPA, leave open room for developers to list possible mitigation measures or alternatives without incorporating them. With the protection of the marine environment and ecology being a high priority for many, an increase in substantive requirements for developers and agencies to follow are needed. The following paragraphs will outline some of the best methods to ensure responsible offshore wind development.

A. Protection of Flora and Fauna

One of the concerns expressed by opponents of offshore wind is that construction harms animals, such as whales and birds. One way offshore wind development can mitigate negative impacts on wildlife is to avoid construction near areas critical to wildlife during times such as breeding or migration.[125] Currently, there is no legal blanket requirement to halt construction. BOEM considers each project on a project-by-project base when considering

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[122] *Environmental Consultations for Offshore Renewable Energy Projects on the Atlantic Outer Continental Shelf,* BUREAU OF OCEAN ENERGY MGMT. (last visited Aug. 22, 2025).
[123] *See id.*
[124] U.S. GOV'T ACCOUNTABILITY OFF., GAO-25-106998, ACTIONS NEEDED TO ADDRESS GAPS IN INTERIOR'S OVERSIGHT OF DEVELOPMENT (2025).
[125] *See* Wojcicki, *supra* note 29.

Environmental Impact Statements (EIS) under NEPA, looking at critical habitats and the potential impacts on wildlife.[126] However, it has been noted that there is still much unknown about the impacts, such as those on bird migration in the U.S.[127] Often BOEM will favor alternative mitigation techniques rather than shutdown a project, to ensure that there is no substantial delay in construction or permitting.[128] While a complete shutdown, even temporary, may not be ideal for developers, it would reduce the displacement of the animals that often are the subject of suits brought against BOEM, even when current EIS provide for mitigation plans.[129] In fact, Dominion must stop all pile driving of foundations on the Coastal Virginia Offshore Wind project during the 6-month right whale migratory season.[130]

Additionally, during the construction and operation of offshore wind farms, boats and ships are necessary to bring people to substations and transport people and materials to the actual farm location. Speed restrictions for offshore wind vessels should be adopted to reduce the chances of collisions with whales or other marine animals.[131] For example, the South Fork Wind Project in New York put forth an agreement with the Natural Resources Defense Council, National Wildlife Federation, and Conservation Law Foundation to limit vessels to a 10-knot speed limit to protect right whales throughout the lifetime of the project.[132] Offshore wind projects could consider different routes when laying transmission cables to avoid important seagrass beds, coral reef environments, or nurseries.

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[126] *See* GAO, *supra* note 124, at 19-23.
[127] *Id.* at 22.
[128] *See e.g.,* *Proposed Mitigations for Offshore Wind Energy Development,* BUREAU OF OCEAN ENERGY MGMT., (last visited Aug. 22, 2025); *see also,* *BOEM's NEPA Screening Criteria for Offshore Wind Projects Are a Big Step Toward Permitting Certainty,* THE POWER LINE (July 19, 2022).
[129] *See* Mayor & City Council of Ocean City v. U.S. Dep't of the Interior, No. 1:24-cv-03111 (D. Md. 2024); *see* Cnty. of Cape May v. United States, No. 1:23-cv-21201 (D.N.J. 2023).
[130] *Timeline,* Dominion Energy Coastal Virginia Offshore Wind (last visited Aug. 22, 2025); Dr. Francine Kershaw, *Landmark Offshore Wind Agreement Protects Right Whales, ,* NAT. RES. DEF. COUNCIL (Jan. 23, 2019).
[131] Alison Chase, *Responsible Offshore Wind Requires Smart Vessel Speeds,* NAT. RES. DEF. COUNCIL (Aug. 4, 2022).
[132] *Id.*

This has been seen in a handful of EISs for offshore wind projects such as the Vineyard Wind Project[133] and Beacon Wind Project.[134]

Taking precautionary measures like the ones mentioned above will not only ensure the safety of these animals but will also help regain public trust.

B. Marine Spatial Planning

A critical step in protecting marine life is establishing a unified system or standardized approach to Marine Spatial Planning (MSP). MSP is a process that compiles data from different ocean users and applies the information gathered to show how the ocean is used.[135] Currently, data collection methods vary widely across states and federal agencies, leading to issues such as data loss during transfer, outdated datasets, and inconsistencies that hinder effective decision-making. According to the Department of Energy's 2022 Offshore Wind Energy Strategies Report, the "current geographic and time coverage of offshore measurements is insufficient to provide needed certainty."[136] One unified data collection system would allow for real-time updates, as information is obtained, ensuring everyone has access to the most current and accurate information.[137] If a single system is not possible, then BOEM must at least adopt standardized data collection and input protocols to improve the efficiency of sharing between jurisdictions and reducing duplicate or conflicting information.

Additionally, to have effective MSP, there must be greater communication and engagement with those utilizing the ocean, including commercial fishermen, marine biologists, shipping companies, and local community members.[138]

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[133] *See* *Frequently Asked Questions*, VINEYARD WIND (last visited Aug. 22, 2025).
[134] *See* AECOM, CONSTRUCTION AND OPERATION PLAN VOLUME 1: PROJECT DESCRIPTION 2-27 (2023).
[135] *See* *Marine Spatial Planning*, THE NATURE CONSERVANCY (last visited Mar. 4, 2025).
[136] NATE MCKENZIE & MONICA MAHER, U.S. DEP'T OF ENERGY, OFFSHORE WIND ENERGY STRATEGIES 16 (2022).
[137] *See* James Morris, *Workshop Highlights Data Needs for Marine Spatial Planning in Federal Waters off Virginia, North Carolina, and South Carolina*, NAT'L CTRS. FOR COASTAL OCEAN SCI. (Sept. 5, 2024).
[138] *See* Alicia Said & Brice Trouillet, *Bringing 'Deep Knowledge' of Fisheries into Marine Spatial Planning*, 19 MAR. STUD. 347, 350 (2020).

Likewise, NGOs, such as the Nature Conservancy,[139] who are passionate about the environment and already conduct MSP, will be able to contribute to the collective data set, creating a more wholistic and accurate picture of the ocean's biodiversity, weather conditions, and topography. This could allow for better site planning and construction to reduce marine impact.

While MSP is typically used to determine appropriate sites for offshore wind projects, its potential extends to post-construction monitoring.[140] Updating MSP technology would allow developers and agencies to monitor how fisheries fluctuate, sediment changes and moves, and ecological health are faring after large wind farms are installed. Tracking changes over time can create adaptive management plans and encourage regulators and developers to refine mitigation measures if needed. This practice is beginning to be seen in the offshore wind field, such as with the United Kingdom's Marine Management Organization who has worked to standardize post-consent monitoring for offshore wind farms, allowing the data collected to be compared more easily across projects after development.[141] Having updated MSP tools would make this task easier and more efficient.

C. Best Available Technologies

Offshore wind projects must also implement the best available technology practices to ensure the development is done responsibly. Offshore wind is a new and rapidly changing energy field, and we continue to learn more about what works and what does not as more projects emerge. One example of a best practice to minimize environmental impact is through artificial reef construction. Studies from Europe have shown that turbines with monopile foundations surrounded by rocks are more likely to attract fish than monopile foundations surrounded by sandbags or jacket foundations. Following the example of established offshore

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[139] *Marine Spatial Planning, supra* note 135.
[140] M. Martín-Betancor et al., *Evaluation of Maritime Spatial Planning for Offshore Wind Energy in the Canary Islands: A Comparative Analysis*, 161 MARINE POL'Y 1 (2024).
[141] Philippa Blyth, *Standardisation of Post-Consent Monitoring of Offshore Wind Farms*, GOV.UK (Apr. 25, 2025).

wind farms, having a monopile foundation surrounded by rocks or sandbags,[142] should become a standard best practice. Continued technological advancements are essential in this field. For example, grid technology advancements, such as advanced storage systems and transmission infrastructure, will allow offshore wind farms to integrate more effectively into the energy grid.[143] Additionally, technological advances to create floating wind turbines are already being discussed. A floating wind turbine will decrease the cost of infrastructure and increase energy generation capacity.[144] It will also allow for minimal environmental disruption because there would be no need for a foundation that disrupts the seafloor and surrounding habitats.[145]

An additional opportunity to implement best available technology would be to ensure that wind turbines have monitoring devices. These monitoring devices would be installed with the wind turbine and send signals indicating the movement of bird or marine animal populations. This will not only inform BOEM of when migration is happening but could allow the turbine operator to temporarily shut down the turbine to ensure the safe passage of these animals.[146] Likewise, requiring "double bubble curtains" during turbine installation should be a standardized practice, as seen in the Vineyard Wind and South Fork Wind projects. Double bubble curtains use hoses around the construction area to produce bubbles, mitigating the sounds during construction.[147] The goal is to minimize the sound for marine life including animals communicating via sound frequencies such as whales, making them less likely to be harmed or displaced.[148]

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[142] *See id.*
[143] *See* *Offshore Wind Advanced Technology Demonstration*, U.S. DEP'T OF ENERGY (last visited Aug. 22, 2025).
[144] *Id.*
[145] While floating turbines are environmentally friendly, their cost often knocks them out of consideration, so until further technological advancements make development cheaper, this will not be a viable solution.
[146] *See e.g.,* Andrew Lee, *Dutch shut down offshore wind turbines to save birds in 'international first'*, RECHARGE (May 16, 2023) (the Netherlands shut down wind turbines to help migrating birds after notice of a massive bird migration.).
[147] *See* Heather Richards, *Blowing Bubbles: Offshore Wind's New Strategy to Save Whales*, E&E NEWS (Dec. 13, 2023, 1:24 PM).
[148] *Id.*

D. Community Consideration

Developers should also consider local communities because responsible development involves more than protecting the environment—it also affects people's lives in the area. Social implications include but are not limited to: (1) job loss and displacement; (2) equitable distribution concerns; and (3) social acceptance. For example, while offshore wind can create jobs it can also disrupt others. Fishermen located near the Vineyard Wind Project feared loss of jobs due to the turbines being located on prime fishing grounds, resulting in the project developer agreeing to pay to compensate for future losses.[149] Another example of a social implication arose with the Block Island Wind Project, showing the benefit of community consideration. Deepwater Wind, the developer, hired a community liaison to ensure that the community felt included, resulting in greater acceptance and trust of the project, allowing it to avoid pushbacks and legal disputes.[150]

There needs to be more collaboration with developers and the local community through Community Benefit Agreements (CBAs), which are legally binding contracts between the community and developers to shape how a development contributes to the community.[151] This will "help ensure coastal communities benefit from nearby offshore wind projects, with Congress taking steps to incentivize CBAs during the leasing process formally."[152] Examples of benefits in CBAs can be giving priority to local residents who seek a job opportunity on the project, paying for necessary port infrastructure improvements, creating training programs or partnerships with local institutions, or even having monthly public forums to share updates and receive input about the project. Vineyard Wind has a CBA with Martha's Vineyard that outlines agreements between the offshore wind farm and key local stakeholders, such as seasonal visitors, residents, local officials, fisheries, and tribal communities.[153] Agreements

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[149] *Fishermen Fear Encroachment from Offshore Wind Projects,* ASSOCIATED PRESS NEWS (May 23, 2021, 2:54 PM).
[150] Nick Battista, *Lessons Learned on Offshore Wind*, ISLAND INST. (Apr. 7, 2015).
[151] *See Community Benefits Agreements Database*, SABIN CTR. FOR CLIMATE CHANGE L. (last visited Aug. 22, 2025).
[152] Wojcicki, *supra* note 29.
[153] THIRD AMENDED AND RESTATED COMMUNITY BENEFITS AGREEMENT (VINEYARD WIND 1) (2022).

include, but not limited to, creating a Visitor's Center for the wind farm, advertising, conducting community engagement and outreach, and communicating benefits of the wind farm to mitigate and address local opposition.[154]

Additionally, developers should introduce compensation. For example, North Carolina has joined ten other East Coast states, including Maine, Rhode Island, and New York,[155] in their work to establish a regional financial compensation program that collaborates with commercial fishermen to cover economic losses resulting from Atlantic offshore wind development.[156] The process is described as that of an insurance claim where "[t]he regional fund administrator would hold the money, they would accept the claims and evaluate the claims for eligibility and appropriateness and then make a payment to the fisherman based on that claim."[157] This method of "insurance claim" has been used by other offshore wind development companies, such as South Fork Wind, which provides fishers for compensation if they were harmed by the construction, operation, and decommissioning of the wind farm.[158] Eligible individuals file a claim and are awarded financial compensation through the fund.
While the "insurance claim" method is an ideal choice, the issue arises with funding, as the fisheries mitigation project does not have set funding. One method of funding for these types of initiatives could be through developers. For example, Vineyard Wind created a fisheries compensation program funded by the company that developed and constructed the offshore wind farm.[159] The compensation program opened an application for eligible fishermen and the Vineyard Wind developer portioned funds for Massachusetts, Rhode Island, and other states to be distributed to these fishermen.[160] Furthermore, developer contributions could be

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[154] *Id.*
[155] *Fisheries Mitigation Project*, SPECIAL INITIATIVE ON OFFSHORE WIND (last visited Aug. 22, 2025).
[156] *See* Trista Talton, *NC Joins Pact to Cover Offshore Wind-Related Fisheries Losses*, COASTAL REV. (June 14, 2023).
[157] *Id.* (quoting Kris Ohleth).
[158] *Rhode Island Fisheries Direct Compensation Program*, SOUTH FORK WIND (last visited Aug. 22, 2025).
[159] *Frequently Asked Questions*, VINEYARD WIND 1 FISHERIES COMPENSATION FUNDS (last visited Aug. 22, 2025).
[160] *Id.*

required as part of the lease agreements with BOEM or in mandated CBAs, ensuring that there is some method of compensation for any harm that could occur. If not by developers, federal agencies can also provide funds for those experiencing economic and property loss. For example, The Fishermen's Contingency Fund was established by NOAA and provides compensation to those who have loss income due to reduced fish catch as a result of oil and gas obstructions on the OCS.[161] The fund is primarily funded from fees collected from offshore oil and gas interests on the OCS.[162] The funding for an offshore wind fund could some from fees collected during inspections or from taxes the energy company has to pay. Additionally, grants from federal agencies could be available for those impacted by the offshore wind development.

E. Compliance and Implementation Requirements

There needs to be a method to ensure developers and energy companies comply with these responsible development practices. The most effective enforcement would be to enshrine responsible development practices into federal law, so the requirements apply to all projects under federal jurisdiction. The federal regulations need to outline specific steps to develop responsibly, creating a list of requirements like 30 C.F.R. § 585.102, which outlines the responsibilities of BOEM.[163] States and BOEM must work with environmental organizations and technical experts to implement and regularly update environmental protection strategies and regulations to ensure developers follow best practices in reducing environmental harm.[164]

Another method to ensure responsible development is to have BOEM require the use of best available technology and environmental protection in their lease agreements and permits. Currently, under the COP requirements in 30 C.F.R. §585, BOEM can require developers to demonstrate the uses of best available and safest technologies.[165] BOEM lease agreements would lay out steps the developer

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[161] *Fishermen's Contingency Fund Program,* NOAA (last updated Mar. 20, 2025).
[162] *Id.*
[163] 30 C.F.R. § 585.102.
[164] *Id.* § 585.105.
[165] *Id.* §585.621.

must follow to lease the designated area, such as contributing research to the MSP. Both federal and state agencies need to work in tandem with environmental organizations to create plans, which could be included in the offshore wind development permits, "to use best available species protection practices, test new technology, provide data, and adapt to changing circumstances as more is learned about offshore wind construction and operation and species contact," similar to the Vineyard Wind's developer who worked voluntarily with environmental groups.[166] Similarly, when BOEM approves a COP, it can require that the developers address each of these topics.[167] The caveat is that best practices need to go beyond the initial approval. Best practices should be included in the COP for future post-monitoring of the development site by the developer. The lifespan of offshore wind farms can be up to thirty or more years, and BOEM should approve COPs that give a detailed post-monitoring approach to ensure long-term environmental compliance.

While not legally binding, having offshore wind industry associations, such as the American Clean Power Association[168] and the National Ocean Industries Association,[169] adopt standards of best practice that incorporate the above suggestions could be very influential. Industry associations are influential because they represent the interests of businesses and stakeholders within a specific sector, in this case offshore wind and renewable energy. These associations help shape public policy by lobbying government agencies and lawmakers, providing research into their position, and promoting best practices within the industry. Also, these associations can guide developers on compliance and market trends and help the industry succeed.

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[166] MICHAEL O'BOYLE ET. AL., POLICY PRIORITIES TO ENSURE OFFSHORE WIND PLAYS A CENTRAL RILE IN OUT NET-ZERO FUTURE A 2035 3.0 COMPANION REPORT, ENERGY INNOVATION (2023).
[167] Under 30 C.F.R. §585.628, BOEM has the authority to grant or deny a COP.
[168] *Home Page*, AM. CLEAN POWER (last visited Aug. 22, 2025).
[169] *Welcome to NOIA*, NAT'L OCEAN INDUS. ASS'N (last visited Mar. 3, 2025).

VII. CONCLUSION

The climate is changing at a pace that will reach levels of harm that will be difficult to remedy.[170] One of the best ways to ensure the longevity and stability of the climate will be to reduce the use of fossil fuels to lower our greenhouse gas emissions. In addition to the changing environment, we face the issue of growing populations and rising demand for energy. As many states have suggested in their climate plans, the solution is to move toward renewable energy. Offshore wind development will be essential for sufficient renewable energy to match growing electricity needs. The mass scale and complexity of offshore wind infrastructure bring environmental concerns that should not be ignored. Current trends of the Trump administration impede offshore wind development. While these actions are likely not going to stop the development of renewable energy, the administration's actions affecting offshore wind development have been very disruptive and contribute to a negative perception of offshore wind, as it can lead the public to believe the practice is unstable or environmentally unfriendly. As seen in the increasing number of cases brought against BOEM, members of the public have concerns about offshore wind development.[171]

Responsible offshore wind development may look different for everyone, but clear communication and transparency are key throughout the process. This is a continuing requirement, not a one-step task. Technologies and best practice strategies should continuously be updated. MSP should be updated with information as soon as possible and include data from everyone involved, such as commercial fishers. Policy needs to evolve to reflect a growing knowledge base and ensure compliance by all. Offshore wind is essential to meet increasing energy demand, and it needs to be done responsibly; because the end goal of the shift to renewable energy is to reduce the rate of climate change and make the planet healthier for future generations. BOEM and state agencies need to take additional steps and go beyond the minimum prescribed by law to ensure the implementation of responsible development practices. Their goal should be to

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[170] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2023: SYNTHESIS REPORT 24 (2023).
[171] *See* Mayor & City Council of Ocean City v. U.S. Dep't of the Interior, No. 1:24-cv-03111 (D. Md. 2024); *see* Cnty. of Cape May v. United States, No. 1:23-cv-21201 (D.N.J. 2023).

collaborate with the communities that offshore wind projects will impact. Solutions such as continuous communication with fishermen, scientists, and government officials in mapping the ocean to get a fuller picture of where marine life thrives and supporting innovative technology to make wind turbines minimally invasive, will be essential. These also need to be implemented through some method of enforcement, such as federal law, BOEM contracts, or through industry association best practices.